XII. "An Experimental Investigation of the Central Motor Innervation of the Larynx. Part I. Excitation Experiments." By FELIX SEMON, M.D., F.R.C.P., and VICTOR HORSLEY, B.S., F.R.S. (From the Laboratory of the Brown Institution.) Received June 17, 1890.

(Abstract.)

In this paper the authors communicate the first part of a series of researches in which they have been engaged from time to time since 1886, on the nature of the representation of the intrinsic laryngeal movements in the central nervous system.

Briefly stated, the *anatomical* arrangement of the laryngeal nerve centres they believe to be as follows:—

a. Cortical areas of representation.
b. Connecting fibres in the corona radiata and the internal capsule.
c. Bulbar areas of representation.

So also the *physiological* differentiation existing in the functional activity of these centres and fibres they regard as to be viewed from two standpoints—

1. The *phonatory* laryngeal movements.
2. The *respiratory* laryngeal movements.

Of these the former are shown to be especially represented in the cortex, and the latter more particularly in the bulb.

After a complete historical *résumé* of the experimental, and also clinical, work already done on the subject, the authors describe and discuss the experimental procedure adopted by them, with especial reference to the complications introduced in the employment of varying intensity of stimulation, depth of anæsthesia, species, individual peculiarities, and age of the animal.

The results are then arranged in order, according to the part stimulated, beginning with the cortex cerebri and ending with the bulb.

It is shown that in the cortex cerebri there is represented the *phonatory* movement of adduction,* and that this is more completely developed, the higher the animal is in the scale of evolution.

Further, that in the neighbouring regions of the cortex the respiratory movements of the larynx, acceleration, intensification, and slowing, are also represented. Only in one kind of animal, viz., the cat, were a focus and area of pure cortical representation of abduction

* Discovered by Ferrier and accurately localised in the dog by Krause.

observed. Notice is taken of the meaning of the acceleration or polypnœa thus evoked, and of its relation to the thermotaxic function suggested.

Excitation of the corona radiata and the internal capsule resulted in the mapping out of the fibres conducting the above motor effects downwards, and it is suggested that the localisation by previous observers of basal centres for the functions above mentioned is possibly to be accounted for differently in the light of these observations.

Finally, the results of exploring the floor of the fourth ventricle by excitation are described, so far as intrinsic effects were produced in the larynx. The representation of adduction and abduction movements respectively was thus localised.

In conclusion, the relations of the various parts of this central mechanism to one another are shortly discussed.

XIII. "Contributions to the Molecular Theory of Induced Magnetism." By J. A. Ewing, F.R.S., Professor of Engineering in University College, Dundee. Received June 18, 1890.

As the facts of induced magnetism become better known, increasing interest attaches to molecular theories and increasing difficulty attends the theories that are current. Weber's fundamental conception that the molecules of iron or nickel or cobalt are always magnets, and that the process of magnetising consists in turning them from many directions towards one direction, has been strongly confirmed by the now well established fact that there is a true saturation value, a finite limit to the intensity of magnetism, which may be reached or very closely approached by using a strong magnetic force.* Without going further back, to enquire (with Ampère) how the molecules come to be magnets, we may take this conception as the natural starting point of a theory. But when we go on to examine the conditions of constraint on the part of the rotatable molecules which have been suggested to make the theory square with what is known about permeability, about residual magnetism and other effects of magnetic hysteresis, about the effects of stress, of temperature, of mechanical vibration, and so forth, we find a mass of arbitrary assumptions which still leave the subject bristling with difficulties. Many of the phenomena suggest, for instance, the idea that there is a quasi-

* Ewing and Low, 'Phil. Trans.,' 1889, A, p. 221. See also H. E. J. G. du Bois, 'Phil. Mag.,' April, 1890.